

Paged Media Project



Developing a Hydra-based page turning application and
turning a Plum into a Pumpkin

William G. Cowan, Library Technologies
Nicholas Homenda, Digital Collections Services
Digital Library Brown Bag Series, February 1, 2017
#dlbb

Agenda

- Something Old
- Something New
- Something Borrowed
- Something Blue

Something Old: Project History



Variations

The Indiana University Digital Music Library

- 1995: intend to create databases of score notation
- 1999: planned enhancement

Variations Online Scores Prototype

VARIATIONS

VARIATIONS Prototype: Online Musical Scores

The following selections lead to experimental prototypes of the ways in which musical scores and recording liner notes might be used in conjunction with sound recordings. Please contact varia@dlib.indiana.edu to help us in our ongoing development of the project.

Due to the early developmental status of this phase of VARIATIONS, we will not be able to guarantee continued availability of this resource or any of its component interfaces at this time.

Online scores: Opera Literature

- Selected opera scores chosen from the Cook Music Library's holdings
- Scores are in the public domain
- Available from anywhere
- Designed to be viewed on a 17-inch monitor with a screen resolution of 1024 x 768
- Designed primarily for online display, not for printing.

Online scores: Song Literature

- Selected scores chosen from the Cook Music Library's holdings
- Scores are in the public domain
- Available from anywhere
- Designed to be viewed on a 17-inch monitor with a screen resolution of 1024x 768
- Designed primarily for online display, not for printing.

Online scores: Orchestral and Choral Literature

- Selected scores chosen from the Cook Music Library's holdings
- Scores are in the public domain
- Available from anywhere
- Designed to be viewed on a 17-inch monitor with a screen resolution of 1024 x 768
- Designed primarily for online display, not for printing.

Online scores: Chamber Music Literature

- Selected scores chosen from the Cook Music Library's holdings
- Scores are in the public domain
- Available from anywhere
- Designed to be viewed on a 17-inch monitor with a screen resolution of 1024 x 768
- Designed primarily for online display, not for printing.

Online scores: Piano Literature

- Selected scores chosen from the Cook Music Library's holdings
- Scores are in the public domain
- Available from anywhere
- Designed to be viewed on a 17-inch monitor with a screen resolution of 1024 x 768

Variations Online Scores Prototype

William and Gayle Cook Music Library
Indiana University School of Music

Berlioz *Complete Works: Symphonies Part I*

[View full bibliographic record from IUCAT](#)

[View larger version of this score](#)

Contents

[Front cover](#)

[Title page](#)

[Instrumentation](#)

[Notes](#)

Symphonie fantastique

Movement I

Réveries—Passions

Movement II

Un bal

Movement III

Scène aux champs

Movement IV

Marche au supplice

Movement V. Songe d'une nuit du sabbat

Larghetto

Ronde du Sabbat

Dies irae et Ronde du Sabbat

Symphonie funèbre et triomphale

Marche Funèbre

Oraison Funèbre

Apothéose

Page 3

Symphonie fantastique Fantastische Sinfonie Fantastic Symphony

I.
Réveries — Passions
Träumerien — Leidenschaften Visions and passions

Largo (♩ = 12) H. Berlioz, op. 14

Flauto I, Flauto piccolo
Oboi
2 Clarinetti in B (♩)
1 Li in Es (♩)
4 Corni
3 Fagotti
2 Coristi in B (♩)
2 Trombe in C (♩)
Timpani in C (♩) & (♩)
Violino I
Violino II
Viola
Violoncello
Contrabbasso

Largo (♩ = 12)

EDWIN F. KALMUS
PUBLISHERS OF MUSIC
NEW YORK, N. Y.

Page 4

Piu mosso

Flauto I, Flauto piccolo
Oboi
2 Clarinetti in B (♩)
1 Li in Es (♩)
4 Corni
3 Fagotti
2 Coristi in B (♩)
2 Trombe in C (♩)
Timpani in C (♩) & (♩)
Violino I
Violino II
Viola
Violoncello
Contrabbasso

Piu mosso

EDWIN F. KALMUS
PUBLISHERS OF MUSIC
NEW YORK, N. Y.

Variations Musical Scores

[illegible]

Variations Musical Scores

- ~1000 scores and accompanying materials included
- Digitized locally
- Metadata from IUCAT
- Structure from input process

Shortcomings

- Djvu derivatives
- Variations client(s)
- Quicktime for Java

Something New: Paged Media Project

- Collaboration with IUPUI forged in 2013-2014
- IU Bloomington: Replace Variations Scores
- IUPUI: Replace Content DM

The Indianapolis News.

[University Library](#)
[Center for Digital Scholarship](#)
[Browse This Collection](#)
[Partners](#)
[Log in](#) | [? Help](#)

Search within results [Search](#) [Advanced Search](#)

Add or remove other collections to your search:

☒ Indianapolis News

☐ '500' Festival

☐ 3D Collection

☐ Al-Mutanabbi Street Starts Here Coalition Collection

☐ Allison Transmission

☐ [Show 102 more](#)

Narrow your search by:

► Subject

► Type

► Date

Browsing items in: Indianapolis News

(12309 results)

Sort by: [Title](#)

[Display Options](#)

Display: 20

1 2 ... 500 [Next](#)



1869-12-07 News



1869-12-08 News



1869-12-09 Evening News



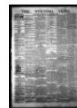
1869-12-10 Evening News



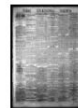
1869-12-11 Evening News



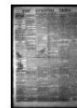
1869-12-14 Evening News



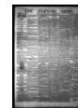
1869-12-15 Evening News



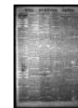
1869-12-16 Evening News



1869-12-17 Evening News



1869-12-18 Evening News



1869-12-20 Evening News



1869-12-21 Evening News



1869-12-22 Evening News



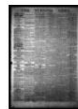
1869-12-23 Evening News



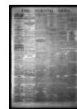
1869-12-24 Evening News



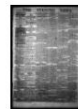
1869-12-25 Evening News



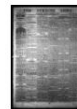
1869-12-27 Evening News



1869-12-28 Evening News



1869-12-29 Evening News



1869-12-30 Evening News

1 2 ... 500 [Next](#)

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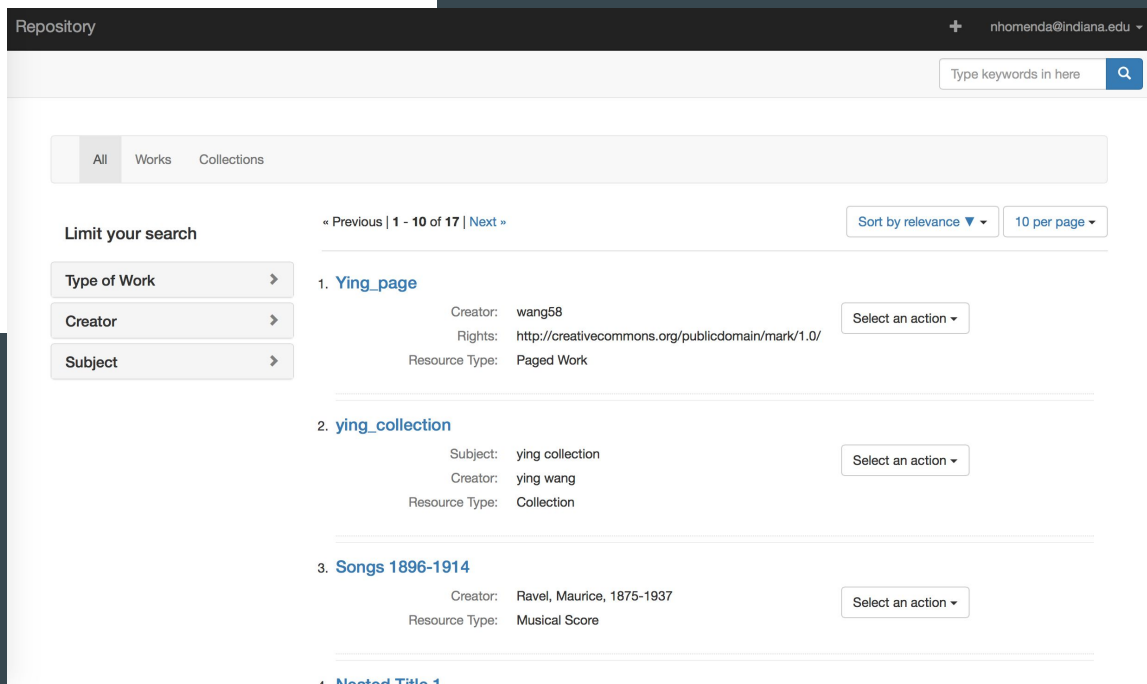
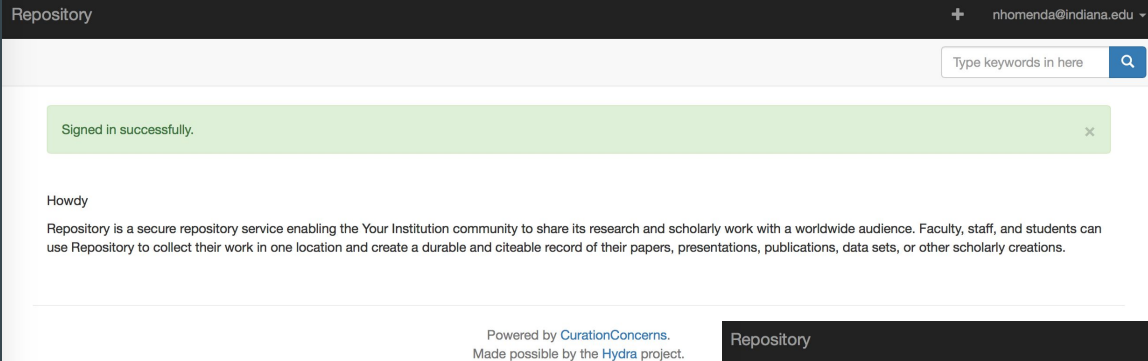
Powered by CONTENTdm®

In 2014...

- Worthwhile
- No agreed-upon content modeling standard
- Fedora 3

In 2014/2015...

- ~~Worthwhile~~ Curation Concerns
- ~~No agreed-upon content modeling standard~~ PCDM
- ~~Fedora 3~~ Fedora 4




Analysis

- Content analysis
- Workflow analysis
- Platform analysis

Something Borrowed: Plum

Plum. A Hydra head to support digitization workflows

 coverage **100%** code climate **3.5** Ready **0** license **Apache 2.0**

Plum is a Hydra head based on [CurationConcerns](#), with two types of works:

- `ScannedResource`: a book or other resource composed of one or more scanned pages
- `MultiVolumeWork`: a book set, sammelband or other resource composed of multiple `ScannedResources`

Features

- Drag-and-drop tools for reordering `FileSets` and editing structure
- Generating IIIF manifests for Collections and Works based on that structure
- Building PDFs of Works based on their IIIF manifests
- Performing OCR with Tesseract
- Simple state-based workflow
- Retrieving external metadata from our finding aids and catalog web services

Dependencies

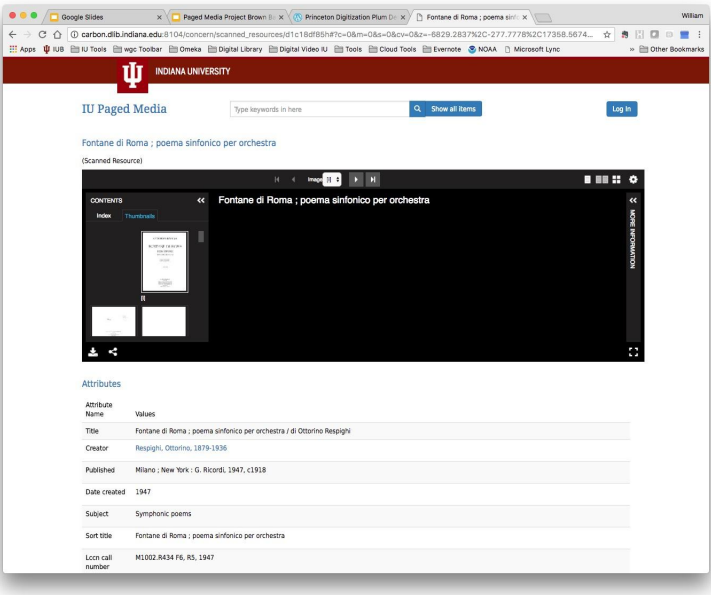
- [Redis](#)
 - Start Redis with `redis-server` or if you're on certain Linuxes, you can do this via `sudo service redis-server start`.
- [Kakadu](#)
 - The installer doesn't work on MacOSX 10.11 (El Capitan), but the files `kdu_compress` and `libkdu_v77R.dylib` can be extracted from the download packages and used by manually installing them in `/usr/local/bin` and `/usr/local/lib` respectively.
- [Tesseract](#)
 - Version 3.04 is required. You can install it on Mac OSX with `brew install tesseract --with-all-languages` For Ubuntu you'll have to [compile](#) it.
- [RabbitMQ](#) (Optional)
 - Start with `rabbitmq-server`
 - Used for publishing create/update/delete events for systems such as [Pomegranate](#)

Running the Tests

Something Borrowed: Plum

Princeton (Plum):

<https://lonewolf librarian.wordpress.com/2016/05/12/princeton-digitization-plum-demo/>



The screenshot shows a web browser window displaying the IU Paged Media interface. The page title is "Fontane di Roma ; poema sinfonico per orchestra" and it is labeled as a "Scanned Resource". The main content area shows a thumbnail of the score and a large viewer window displaying the scanned image of the score. Below the viewer, there is a table of attributes.

Attribute Name	Values
Title	Fontane di Roma ; poema sinfonico per orchestra / di Ottorino Respighi
Creator	Respighi, Ottorino, 1879-1936
Published	Milano ; New York : G. Ricordi, 1947, c1938
Date created	1947
Subject	Symphonic poems
Sort title	Fontane di Roma ; poema sinfonico per orchestra
Icon call number	M102.S634 F6 .R5, 1947

Something New: Hydra / Fedora Technology Stack

- Fedora 4.7.0
- Hydra
- IIIF - International Image Interoperability Framework
- Enterprise Scholarly Systems



Enterprise Scholarly Systems

IU's **Enterprise Scholarly Systems (ESS)** initiative is a new collaborative effort amongst the libraries at IU Bloomington and IUPUI in Indianapolis and IU's central IT organization, University Information Technology Services. Implemented as a virtual organization spanning all three entities, the goal is to create an enterprise repository infrastructure for IU's eight campuses based on Hydra and Fedora.

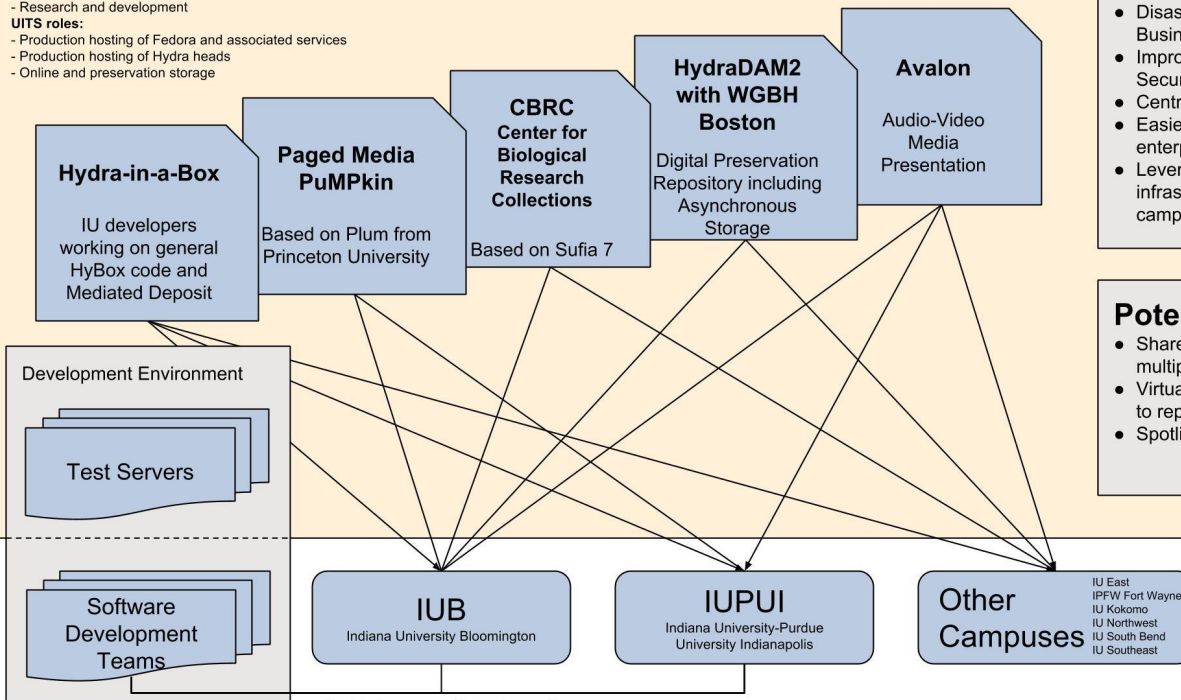
IUB/IUPUI Libraries roles:

- Software development
- User support and consultation
- Research and development

UITS roles:

- Production hosting of Fedora and associated services
- Production hosting of Hydra heads
- Online and preservation storage

UITS



Benefits

- Developers spend more time on development and less time on infrastructure
- Better policy compliance
- Disaster Recovery and Business Continuity
- Improved Monitoring and Security
- Central Funding of Storage
- Easier integration with other enterprise IT services
- Leverage consistent infrastructure across campuses

Potential Services

- Shared Services across multiple campuses
- Virtual Services using Docker to replicate applications
- Spotlight supported Exhibits

Something New: PuMPkin (er, Pages Online)

<https://pages.dlib.indiana.edu>

The screenshot displays the PuMPkin (Pages Online) web interface. The browser window shows the URL <https://pages.dlib.indiana.edu/catalog>. The page features a red header with the Indiana University logo and the text "INDIANA UNIVERSITY". Below the header, the "Pages Online" logo is visible, along with a search bar and a "Log In" button. The main content area shows a list of search results, with the first three items displayed. Each item includes a thumbnail image, a title, and a table of metadata.

1 - 9 of 9


Sort by relevance ▼ 10 per page ▼

Limit your search

- Type of Work >
- Creator >
- Subject >
- Publication Place >
- Publisher >
- Date Created >
- Pages >

1.

Fontane di Roma : poema sinfonico per orchestra




Subject:	Symphonic poems
Creator:	Respighi, Ottorino, 1879-1936
Publisher:	G. Ricordi
Date Created:	1947
Resource Type:	Scanned Resource
Identifier:	http://purl.dlib.indiana.edu/ludl/variables/score/BHR9405
Pages:	70

Select an action ▼

2.

Quartet, D major, for 2 violins, viola and violoncello




Subject:	String quartets
Creator:	Franck, César, 1822-1890
Publisher:	Edition Eulenburg and Ernst Eulenburg
Date Created:	1900
Resource Type:	Scanned Resource
Identifier:	http://purl.dlib.indiana.edu/ludl/variables/score/BHR0088
Pages:	68

Select an action ▼

3.

Gymnopédies, Gnossiennes, and other works for piano



Subject:	Piano music and Piano music (4 hands)
Creator:	Satie, Erik, 1866-1925
Publisher:	Dover
Date Created:	1969
Resource Type:	Scanned Resource
Identifier:	http://purl.dlib.indiana.edu/ludl/variables/score/ACB0890
Pages:	176

Select an action ▼

4.

Link to IU Catalog

Fontane di Roma ; poema sinfonico per orchestra

OTTORINO RESPIGHI

FONTANE DI ROMA

POEMA SINFONICO
PER ORCHESTRA

La Versione di Roma (1917)
La Versione di Roma (1917)
La Versione di Roma (1917)
La Versione di Roma (1917)

PASTORALE
(1917)

G. RICORDI & C.

MILANO

ROMA - NAPOLI - TORINO - GENOVA - FIRENZE
PALERMO - CATANIA - MESSINA - VENEZIA
BARI - BRINDISI - CUNEO - COMO - CREMA
FERRARA - GORIZIA - LECCE - LIVORNO - LUGANO
MANTOVA - MODENA - MONZA - NOVARA - PAVIA
PERUGIA - PORDENONE - RAVENNA - REGGIO EMILIA
ROMA - SALSOMAGGIORE - SASSUOLO - SERRAVALLE
SILVERA - SONDRIO - TREVISO - TRIESTE - UDINE
VERONA - VICENZA - VOGHERA - VOGHERA

View record in IUCAT Open large viewer

Link to IU Catalog - another way

The screenshot shows the IU Pages Online Admin Interface. The browser address bar displays `webapp1.dlib.indiana.edu`. The page header includes the IU logo and navigation links such as 'Bonjour', 'IUB', 'IU Tools', 'wge Toolbar', 'Omeka', 'Digital Library', 'Digital Video IU', 'Tools', 'Cloud Tools', 'Evernote', 'NDAA', 'Microsoft Lync', 'Software Studies', 'Getting Started', 'Latest Headlines', 'Zotero / wmcas...Level Items', 'Apple', 'Bing', 'Google', and '>>'. Below the header, the 'Pages Online Admin Interface' title is followed by a search bar and a 'Show all items' button. A 'Manage Your Work' section provides instructions on enriching metadata. The main content area is divided into two columns: 'Required Information' and 'Additional Information'.

Required Information

Source Metadata ID

ACB0890

☐ Refresh metadata from IUCAT

required Title

Gymnopédies, Gnossiennes, and other works for piano [✖ Remove](#)

[✖ Remove](#)

[+ Add another Title](#)

Additional Information

Portion Note

Description

Please keep your description to 300 words or fewer.

Workflow note

[+ Add another Workflow note](#)

Nav date

Thumbnail

Select the file to be used as the thumbnail for this Scanned Resource.

[0]

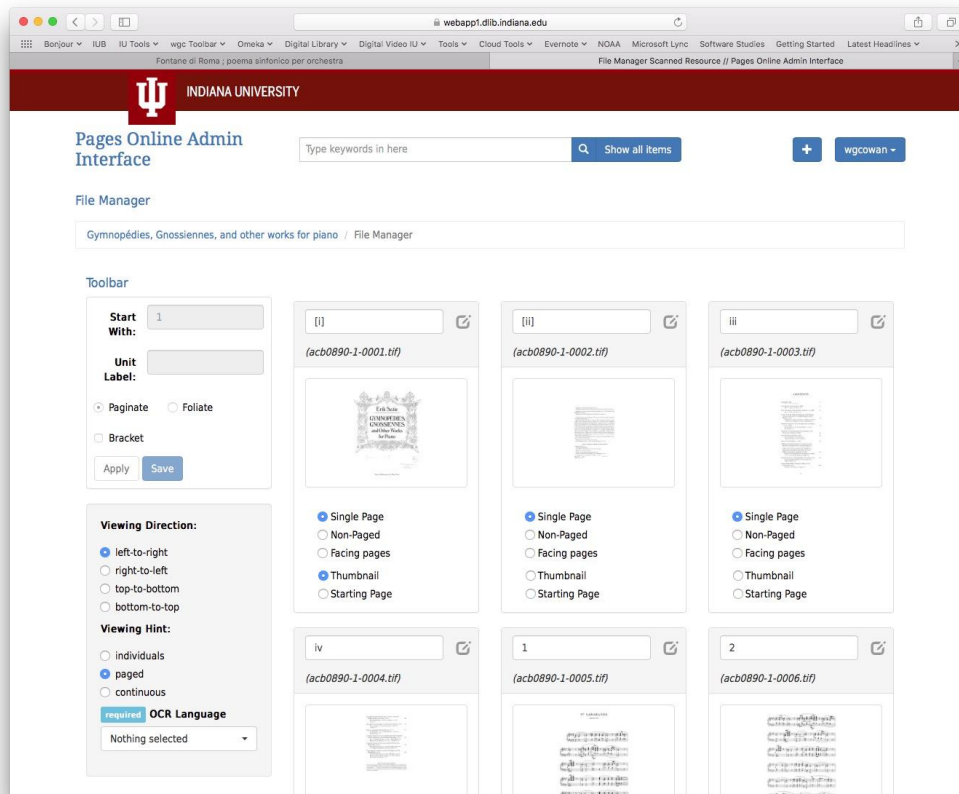
Member of Collections

[View record in IUCAT](#) [Open large viewer](#)



Administration

Admin



Change Content

The screenshot displays the 'Pages Online Admin Interface' for the Indiana University Digital Library. The interface is designed for managing scanned documents. At the top, a navigation bar includes the university logo and a search bar. Below this, the 'File Manager' section is active, showing a list of scanned files. On the left, a 'Toolbar' allows users to configure viewing options. The main area displays six file thumbnails, each with its own configuration panel. The files are labeled with identifiers like '(acb0890-1-0001.tif)' through '(acb0890-1-0006.tif)'. The configuration panels for each file include options for 'Start With', 'Unit Label', 'Viewing Direction' (left-to-right, right-to-left, top-to-bottom, bottom-to-top), 'Viewing Hint' (individuals, paged, continuous), and 'OCR Language' (with a 'required' status indicator). The 'Paged' option is selected for all files, and the 'OCR Language' is currently set to 'Nothing selected'.

webapp1.dlib.indiana.edu

Bonjour IU IU Tools wgc Toolbar Omeka Digital Library Digital Video IU Tools Cloud Tools Evernote NOAA Microsoft Lync Software Studies Getting Started Latest Headlines

Fontane di Roma : poema sinfonico per orchestra File Manager Scanned Resource // Pages Online Admin Interface

Ψ INDIANA UNIVERSITY

Pages Online Admin Interface

Type keywords in here wgcowan

File Manager

Gymnopédies, Gnossiennes, and other works for piano / File Manager

Toolbar

Start With:

Unit Label:

☒ Paginate ☐ Foliate

☐ Bracket

Viewing Direction:

☒ left-to-right

☐ right-to-left

☐ top-to-bottom

☐ bottom-to-top

Viewing Hint:

☐ individuals

☒ paged

☐ continuous

OCR Language

Nothing selected

(acb0890-1-0001.tif)

(acb0890-1-0002.tif)

(acb0890-1-0003.tif)

(acb0890-1-0004.tif)

(acb0890-1-0005.tif)

(acb0890-1-0006.tif)

Single Page

Non-Paged

Facing pages

Thumbnail

Starting Page

Upload New Content

The screenshot shows a web application interface for uploading digital content. A modal dialog box is open, titled "Source: File System", indicating that files are being selected from the local file system. The dialog shows a progress bar at 100% complete and a table of files.

Name	Select All?	Size	Kind	Modified
scores-fixed	<input type="checkbox"/>	28 KB	application/x-directory	2017-01-13 10:07
other_sources	<input type="checkbox"/>	12 KB	application/x-directory	2017-01-31 00:59
aaa0928	<input type="checkbox"/>	4 KB	application/x-directory	2016-10-25 15:56
aaa0038	<input type="checkbox"/>	4 KB	application/x-directory	2016-10-25 16:04
aan8241	<input type="checkbox"/>	20 KB	application/x-directory	2016-10-25 16:53
aap2885	<input type="checkbox"/>	4 KB	application/x-directory	2016-10-25 17:08
aas3532_accmat	<input type="checkbox"/>	8 KB	application/x-directory	2016-10-25 15:13
aat2366	<input type="checkbox"/>	12 KB	application/x-directory	2016-10-25 15:40
aat4369	<input type="checkbox"/>	4 KB	application/x-directory	2016-10-25 17:09
aat4369-1-0001.tif	<input checked="" type="checkbox"/>	2.24 MB	image/tiff	2016-10-25 15:02
aat4369-1-0002.tif	<input checked="" type="checkbox"/>	17.8 MB	image/tiff	2016-10-25 17:05
aat4369-1-0003.tif	<input checked="" type="checkbox"/>	17.8 MB	image/tiff	2016-10-25 17:04
aat4369-1-0004.tif	<input type="checkbox"/>	2.24 MB	image/tiff	2016-10-25 16:05
aat4369-1-0005.tif	<input type="checkbox"/>	2.24 MB	image/tiff	2016-10-25 16:06
aat4369-1-0006.tif	<input type="checkbox"/>	17.8 MB	image/tiff	2016-10-25 15:53
aat4369-1-0007.tif	<input type="checkbox"/>	2.24 MB	image/tiff	2016-10-25 15:00
aat4369-1-0008.tif	<input type="checkbox"/>	2.24 MB	image/tiff	2016-10-25 15:02
aat4369-1-0009.tif	<input type="checkbox"/>	17.8 MB	image/tiff	2016-10-25 17:09

3 files selected

Buttons: Cancel, Submit

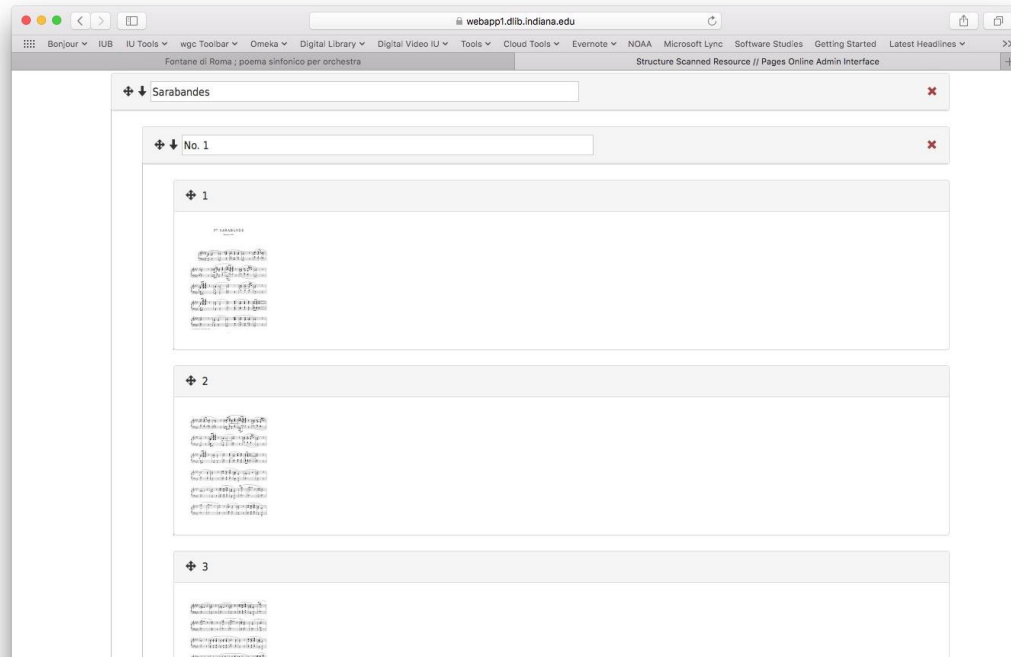
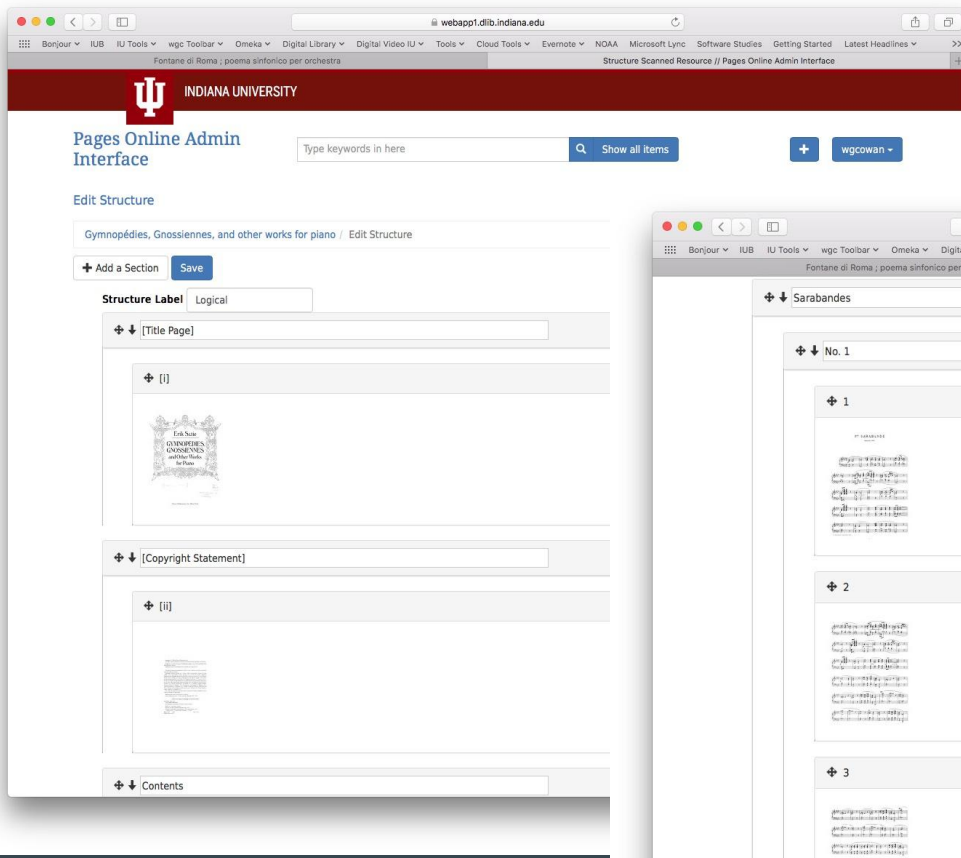
The background interface includes a navigation bar with links like "Paginate", "Foliate", "Starting Page", and "Bracket". It also has a "Viewing Direction" section with radio buttons for "left-to-right", "right-to-left", "top-to-bottom", and "bottom-to-top". A "Viewing Hint" section has radio buttons for "individuals", "paged", and "continuous". An "OCR Language" dropdown is set to "Nothing selected". An "Attach Files" section has buttons for "Select files...", "Start upload", "Cancel upload", and "Upload from Server".

FULFILLING the PROMISE

INDIANA UNIVERSITY

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Change Structure



Something New: PuMPkin (er, Pages Online)

<https://pages.dlib.indiana.edu>

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- Publisher >
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- Pages >

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Pages:	70

Select an action ▼

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Pages:	68

Select an action ▼

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Date Created:	1969
Resource Type:	Scanned Resource
Identifier:	http://purl.dlib.indiana.edu/ludl/variations/score/ACB0890
Pages:	176

Select an action ▼

4.

Something Blue - the Nature of the Hydra

Hyrax

Hyku

Questions?

wgcowan@iu.edu

nhomenda@indiana.edu